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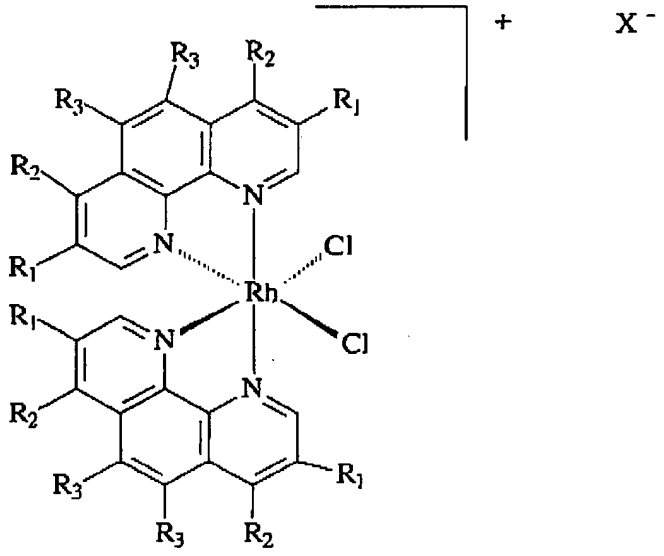
Preliminary Amendment
Applicant(s): Morrison et al.
Serial No.: 10/523,315
Filed: 1 August 2003
For: PHOTOACTIVATED ANTI-VIRAL AND ANTI-CANCER AGENT

Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the above-identified application:

Listing of Claims

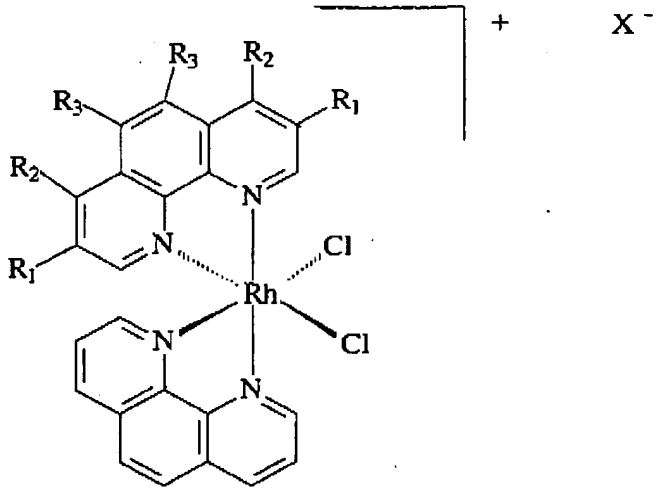
1. (original) A compound having formula I



I

wherein R_1, R_2 and R_3 are each independently selected from the group consisting of an alkyl group, an alkenyl group, an alkynyl group, a nitrile, an azide, an aryl group, an aralkyl group, a heteroaryl group, a hydroxy group, an alkoxy group, an aryloxy group, an amine group, and a hydrogen atom, or any two of R_1, R_2 and R_3 together form an aryl or heteroaryl ring; and wherein X is a counterion, with the proviso that where $R_1 = R_3 = H$, R_2 is neither methyl nor phenyl.

2. (original) A compound having the formula II



II

wherein R_1, R_2 and R_3 are each independently selected from the group consisting of an alkyl group, an alkenyl group, an alkynyl group, a nitrile, an azide, an aryl group, an aralkyl group, a heteroaryl group, a hydroxy group, an alkoxy group, an aryloxy group, an amine group, and a hydrogen atom, or any two of R_1, R_2 and R_3 together form an aryl or heteroaryl ring, and wherein X is a counterion.

3. (original) The compound of claim 1 or 2 wherein $R_1 = R_2 = H$ and $R_3 = (C1\text{-}C4)$ alkyl.

4. (original) The compound of claim 1 wherein $R_1 = R_2 = H$ and $R_3 = CH_3$ (*cis*-dichlorobis(5,6-dimethyl-1,10-phenanthroline)rhodium (III) chloride; 56TMBP).

5. (original) The compound of claim 1 or 2 wherein $R_1 = R_2 = (C1\text{-}C4)$ alkyl and $R_3 = H$.

6. (original) The compound of claim 1 wherein $R_1 = R_2 = CH_3$ and $R_3 = H$ (*cis*-dishlorobis(3,4,7,8-tetramethyl-1,10-phenanthroline)rhodium(III)chloride; OCTBP)

7. (original) The compound of claim 1 or 2 wherein $R_1 = R_3 = H$ and $R_2 =$ N-(C1-C4)alkyl.

8. (original) The compound of claim 1 wherein $R_1 = R_3 = H$ and $R_2 = N(CH_3)_2$ (*cis*-dichlorobis{N,N-dimethylamino)-1,10-phenanthroline}rhodium(III)chloride; BISNMe2).

9. (original) The compound of claim 1 or 2 wherein $R_1 = R_3 = H$ and $R_2 =$ O-(C1-C4) alkyl.

10. (original) The compound of claim 1 wherein $R_1 = R_3 = H$ and $R_2 = O\text{-}CH_3$ (*cis*-dichlorobis(3,7-dimethoxy-1,10-phenanthroline)rhodium(III)chloride; TMOBP).

11. (original) The compound of claim 1 wherein $R_1 = R_3 = H$ and $R_2 =$ O-$(CH_2)(CH_3)_2$ (*cis*-dichlorobis(3,7-diisopropoxy-1,10-phenanthroline)rhodium(III)chloride; TIOBP).

12. (original) The compound of claim 1 or 2 wherein $R_1 = R_3 = H$ and $R_2 =$ (C1-C4)phenyl.

13. (original) *Cis*-dichloro{2,3-di(2-pyridyl)quinoxaline}{1,10 phenanthroline}rhodium (III) chloride (TAPPHEN).

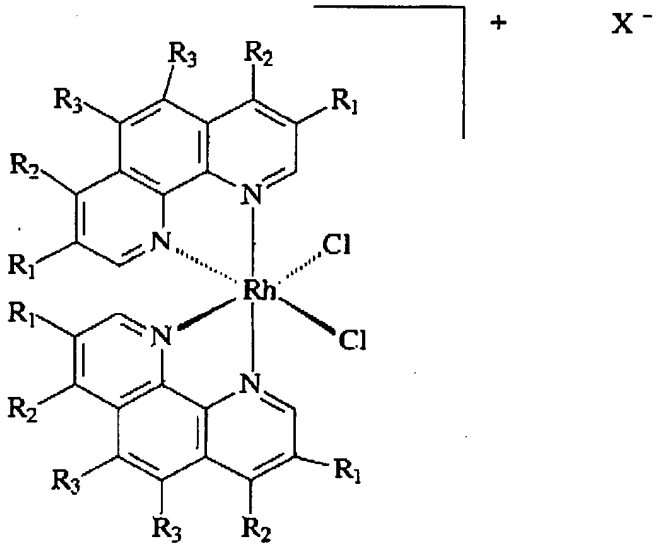
14. (original) *Cis*-dichlorobis{2,3-di(2-pyridyl)quinoxaline} rhodium (III) chloride (BISTAP).

15. (original) *Cis*-dichloro(dipyrido[3,2a–2'3'c]phenazine)(1,10-phenantroline) rhodium (III) chloride (DPPZPHEN).

16. (original) *Cis*-dichlorobis {dipyrido(3,2-a: 2',3'-c)phenazine}rhodium (III) chloride (BISDPPZ).

17. (original) A method for reducing the level of pathogenic contaminants in a biological material comprising :

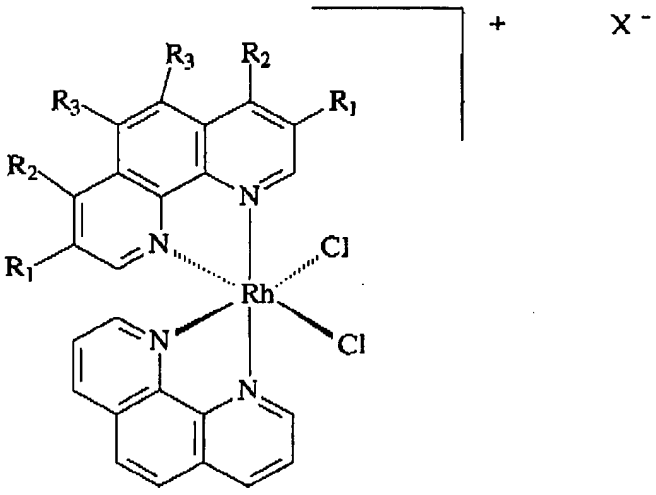
(a) contacting the biological material with an effective amount of at least one bisbipyridyl rhodium (III) compound having the formula I, II, III or IV:



I

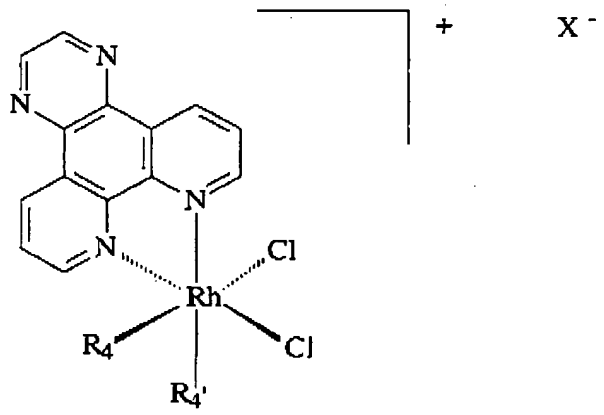
wherein R_1, R_2 and R_3 are each independently selected from the group consisting of an alkyl group, an alkenyl group, an alkynyl group, a nitrile, an azide, an aryl group, an aralkyl group, a heteroaryl group, a hydroxy group, an alkoxy group, an aryloxy group, an amine group, and a hydrogen atom, or any two of R_1, R_2 and R_3 together form an aryl or heteroaryl ring; and wherein

X is a counterion, with the proviso that where $R_1 = R_3 = H$, R_2 is not methyl, and where $R_1 = R_2 = H$, R_3 is not methyl;



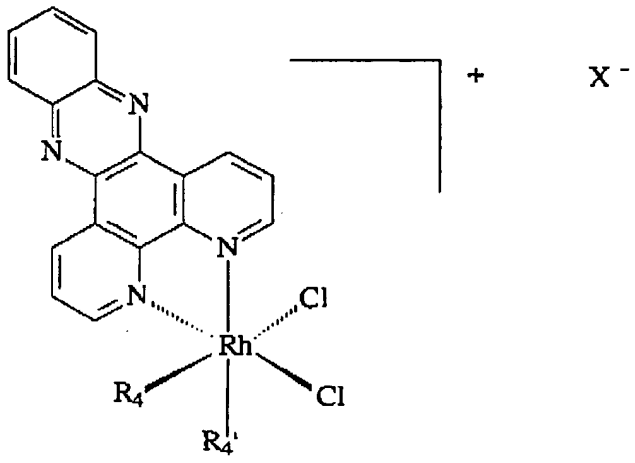
II

wherein R_1, R_2 and R_3 are each independently selected from the group consisting of an alkyl group, an alkenyl group, an alkynyl group, a nitrile, an azide, an aryl group, an aralkyl group, a heteroaryl group, a hydroxy group, an alkoxy group, an aryloxy group, an amine group, and a hydrogen atom, or any two of R_1, R_2 and R_3 together form an aryl or heteroaryl ring, and wherein X is a counterion;



III

wherein R_4 and R_4' together form a phen ligand, yielding *cis*-dichloro{2,3-di(2-pyridyl)quinoxaline}{1,10-phenanthroline}rhodium (III)chloride (TAPPHEN) or a "tap" ligand, yielding *cis*-dichlorobis{2,3-di(2-pyridyl)quinoxaline} rhodium (III) chloride (BISTAP);



IV

wherein R_4 and R_4' together form a phen ligand, yielding *cis*-dichloro(dipyrido[3,2a-2'3'c]phenazine)(1,10-phenantroline) rhodium(III) chloride (DPPZPHEN) or a dppz ligand, yielding *cis*-dichlorobis{dipyrido(3,2-a: 2',3'-c)phenazine}rhodium (III) chloride (BISDPPZ);and

(b) irradiating said biological material for a time sufficient to activate the bisbipyridyl rhodium (III) compound thereby causing a reduction the level of said pathogenic contaminants in said biological material.

18. (original) The method of claim 17 wherein the biological material comprises blood, semen, ascites fluid, milk, lymphatic fluid, an organ, a tissue, a hybridoma cell line, or components thereof.

19. (original) The method of claim 17 wherein the biological material comprises blood or blood components.

20. (original) The method of claim 19 wherein the biological material is substantially free of hemoglobin.

21. (original) The method of claim 20 wherein the biological material comprises at least one blood component selected from the group consisting of platelets, concentrated platelets, plasma, serum and blood proteins.

22. (original) The method of claim 17 wherein the biological material comprise diseased cells in a patient.

23. (original) The method of claim 22 wherein the diseased cells are tumor cells.

24. (original) The method of claim 17 further comprising removing the biological material from patient prior to contacting the biological material with the bisbipyridyl rhodium (III) compound.

25. (original) The method of claim 24 wherein the biological material comprises blood, blood components, or tumor cells.

26. (original) The method of claim 24 further comprising returning the biological material to the patent after irradiation.

27. (currently amended) The method of claim [7] 17 wherein the biological material comprises tumor cells, the method further comprising returning the tumor cells to the patient prior to irradiation.

28. (original) The method of claim 17 wherein step (b) comprises irradiating the biological material with light having a wavelength of 310 nm to 400 nm.

29. (original) The method of claim 28 wherein the irradiating light has a wavelength of 320 nm to 400 nm.

30. (original) The method of claim 17 wherein step (b) comprises irradiating the biological material with light having a wavelength of > 400 nm.

31. (original) The method of claim 17 wherein the pathogenic contaminant comprises a pathogenic organism selected from the group consisting of a bacterium, virus and protozoan.

32. (original) The method of claim 17 wherein the pathogenic contaminant comprises a leukocyte.

33. (original) The method of claim 17 wherein the pathogenic contaminant comprises a tumor cell.

34. (currently amended) The method of claim [1] 17 further comprising, after step (b), removing the bisbipyridyl rhodium (III) compound from the biological material.

35. (original) The method of claim 17 further comprising, prior to step (b), contacting the biological material with a sensitizer molecule having an absorption maximum of greater than 550 nm; wherein step (b) comprises irradiating the biological material with light having a wavelength of greater than 550 nm so as to excite the sensitizer molecule and thereby indirectly activate the bisbipyridyl rhodium (III) compound.

36. (original) The method of claim 35 wherein the biological material comprises blood or blood components.

37. (original) The method of claim 35 wherein the biological material comprises red blood cells.

38. (original) The method of claim 35 wherein the biological material comprises hemoglobin.

39. (original) The method of claim 35 wherein the irradiation sensitizer molecule comprises methylene blue or a derivative thereof.

40. (original) The method of claim 35 wherein irradiation sensitizer molecule comprises acridine orange or a derivative thereof.

41. (original) The method of claim 17 or 35 wherein the bisbipyridyl rhodium (III) compound is selected from the group consisting of *cis*-dichloro(dipyrido[3,2a–2'3'c]phenazine)(1,10-phenantroline) rhodium(III) chloride (DPPZPHEN), *cis*-dichlorobis(3,4,7,8-tetramethyl-1,10-phenanthroline) rhodium(III) chloride (OCTMP), *cis*-dichlorobis{dipyrido(3,2-a: 2',3'-c)phenazine}rhodium (III) chloride (BISDPPZ), *cis*-dichlorobis(3,7-dimethoxy-1,10-phenanthroline) rhodium(III) chloride (TMOBP), *cis*-dichlorobis(3,7-diisopropoxy-1,10-phenanthroline) rhodium(III) chloride (TIOBP), *cis*-dichlorobis{3,7(N,N-dimethylamino)-1,10-phenanthroline} rhodium(III) chloride (BISNMe2), *cis*-dichlorobis(4,7-diphenyl-1,10-phenanthroline) rhodium(III) chloride (TPBP), and *cis*-dichlorobis{2,3-di(2-pyridyl)quinoxaline} rhodium (III) chloride (BISTAP).

42. (original) The method of claim 17 or 35 wherein the bisbipyridyl rhodium (III) compound is DPPZPHEN, OCTMP or BISNMe2